Complete Summary

GUIDELINE TITLE

Treatment of the hypertensive disorders of pregnancy. In: Diagnosis, evaluation and management of the hypertensive disorders of pregnancy.

BIBLIOGRAPHIC SOURCE(S)

Magee LA, Helewa M, Moutquin JM, von Dadelszen P, Hypertension Guideline Committee, Society of Obstetricians and Gynaecologists of Canada. Treatment of the hypertensive disorders of pregnancy. In: Diagnosis, evaluation, and management of the hypertensive disorders of pregnancy. J Obstet Gynaecol Can 2008 Mar;30(3 Suppl 1):S24-36.

GUIDELINE STATUS

This is the current release of the guideline.

COMPLETE SUMMARY CONTENT

SCOPE

DISEASE/CONDITION(S)

Hypertensive disorders of pregnancy (HDP)

- Pre-existing hypertension with comorbid conditions or preeclampsia
- Gestational hypertension with comorbid conditions or preeclampsia

GUIDELINE CATEGORY

Counseling
Management

Screening
Treatment

CLINICAL SPECIALTY

Anesthesiology
Cardiology
Family Practice
Internal Medicine
Obstetrics and Gynecology
Surgery

INTENDED USERS

Advanced Practice Nurses
Nurses
Physician Assistants
Physicians

GUIDELINE OBJECTIVE(S)

To summarize the quality of the evidence to date and provide a reasonable approach to the diagnosis, evaluation, and treatment of hypertensive disorders of pregnancy (HDP)

TARGET POPULATION

Pregnant women with hypertensive disorders of pregnancy (HDP)

INTERVENTIONS AND PRACTICES CONSIDERED

Management/Treatment

Antenatal Treatment

1. Bed rest in hospital for women with gestational hypertension (without preeclampsia)
2. In-patient care for women with severe hypertension or severe preeclampsia
3. Antihypertensive therapy for severe hypertension
4. Antihypertensive therapy for nonsevere hypertension
5. Corticosteroids for acceleration of fetal pulmonary maturity
6. Mode of delivery
7. Anesthesia and fluid administration
8. Aspects of care specific to women with pre-existing hypertension
9. Timing of delivery of women with preeclampsia
10. Magnesium sulfate for eclampsia prophylaxis or treatment
11. Plasma volume expansion for preeclampsia
12. Therapies for hemolysis, elevated liver enzymes, and low platelet count (HELLP) syndrome
13. Other therapies for treatment of preeclampsia

Postpartum Treatment

Care in the Six Weeks Postpartum

1. Blood pressure monitoring
2. Antihypertensive treatment
3. Thromboprophylaxis if indicated

Care Beyond Six Weeks Postpartum

1. Screening for pre-existing hypertension, underlying renal disease, and thrombophilia
2. Counseling about intervals between pregnancies and weight loss
3. Other laboratory tests
4. Healthy diet

MAJOR OUTCOMES CONSIDERED

- Incidence and prevalence of non-severe and severe hypertension
- Incidence and prevalence of preeclampsia
- Incidence and prevalence of small for gestational age infant
- Fetal pulmonary maturity
- Perinatal outcomes (stroke, perinatal death, preterm delivery, stillbirth)
- Maternal morbidity and mortality

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

The literature reviewed included the original hypertensive disorders of pregnancy (HDP) guidelines and their reference lists and an update from 1995. Each subgroup leader provided the Canadian Hypertension Society (CHS) with key words for a subgroup literature search of MEDLINE (1995–2005). Searches were subsequently updated by subgroup members in 2006. Articles were restricted to those published in French or English. The key words used are listed in the Appendix of the original guideline document. The concepts explored for pregnancy and hypertension were diagnosis, evaluation, classification, prediction (using clinical and laboratory markers), prevention, prognosis, treatment of hypertension, other treatments of the hypertensive disorders, general management issues (such as mode of delivery and anaesthetic considerations), and postpartum follow-up (for subsequent pregnancies and long-term health).

A focus was placed on consideration of randomized controlled trials (RCTs) for therapy and evaluation of substantive clinical outcomes (rather than surrogate markers such as laboratory values).

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Quality of Evidence Assessment*

I: Evidence obtained from at least one properly randomized controlled trial

II-1: Evidence from well-designed controlled trials without randomization

II-2: Evidence from well-designed cohort (prospective or retrospective) or case-control studies, preferably from more than one centre or research group

II-3: Evidence obtained from comparisons between times or places with or without the intervention. Dramatic results in uncontrolled experiments (such as the results of treatment with penicillin in the 1940s) could also be included in this category

III: Opinions of respected authorities, based on clinical experience, descriptive studies, or reports of expert committees

*Adapted from the Evaluation of Evidence criteria described in the Canadian Task Force on Preventive Health Care.

METHODS USED TO ANALYZE THE EVIDENCE

Review of Published Meta-Analyses
Systematic Review

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Not stated

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

Canadian obstetricians and internists knowledgeable about hypertensive disorders of pregnancy (HDP) and guideline development participated in the project. Invitations to participate took into account geographical representation, previous

involvement in developing HDP guidelines, ongoing interest and expertise in HDP, and membership in Canadian Hypertension Society (CHS) and/or Society of Obstetricians and Gynaecologists of Canada (SOGC).

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Classification of Recommendations*

A. There is good evidence to recommend the clinical preventive action

B. There is fair evidence to recommend the clinical preventive action

C. The existing evidence is conflicting and does not allow to make a recommendation for or against use of the clinical preventive action; however, other factors may influence decision-making

D. There is fair evidence to recommend against the clinical preventive action

E. There is good evidence to recommend against the clinical preventive action

I. There is insufficient evidence (in quantity or quality) to make a recommendation; however, other factors may influence decision-making

*Adapted from the Evaluation of Evidence criteria described in the Canadian Task Force on Preventive Health Care.

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

External Peer Review
Internal Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

This guideline has been reviewed and approved by the Hypertension Guideline Committee and approved by the Executive and Council of the Society of Obstetricians and Gynaecologists of Canada (SOGC).

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

Definitions of the levels of evidence (I, II-1, II-2, II-3, and III) and grades of recommendations (A-E and I) are provided at the end of the "Major Recommendations" field.

Antenatal Treatment

Dietary Changes

1. New dietary salt restriction is not recommended (**II-2D**).
2. There is insufficient evidence to make a recommendation about the usefulness of the following: ongoing salt restriction among women with pre-existing hypertension (**III-I**), heart-healthy diet (**III-I**), and calorie restriction for obese women (**III-I**).

Lifestyle Changes

1. There is insufficient evidence to make a recommendation about the usefulness of: exercise (**III-I)**, workload reduction (**III-I)**, or stress reduction (**III-I**)
2. For women with gestational hypertension (without preeclampsia), some bed rest in hospital (compared with unrestricted activity at home) may be useful (**I-B**).
3. For women with preeclampsia who are hospitalized, strict bed rest is **not** recommended (**I-D**).
4. For all other women with hypertensive disorders of pregnancy (HDP), the evidence is insufficient to make a recommendation about the usefulness of bed rest, which may nevertheless, be advised based on practical considerations (**III-C**).

Place of Care

1. In-patient care should be provided for women with severe hypertension or severe preeclampsia (**II-2B**).
2. A component of care through hospital day units (**I-B**) or home care (**II-2B**) can be considered for women with non-severe preeclampsia or non-severe (pre-existing or gestational) hypertension.

Antihypertensive Therapy

For Severe Hypertension (Blood Pressure [BP] of > 160 mm Hg Systolic or $\geq$ 110 mm Hg Diastolic

1. BP should be lowered to <160 mm Hg systolic and <110 mm Hg diastolic (**II-2B**).
2. Initial antihypertensive therapy should be with labetalol (**I-A**), nifedipine capsules (**I-A**), nifedipine PA tablets (**I-B**), or hydralazine (**I-A**).
3. *Magnesium Sulphate* ($MgSO_4$) is not recommended as an antihypertensive agent (**I-E**).
4. Continuous fetal heart rate (FHR) monitoring is advised until BP is stable (**III-I**).
5. Nifedipine and $MgSO_4$ can be used contemporaneously (**II-2B**).

For Non-Severe Hypertension (BP of 140–159/90–109 mm Hg)

1. For women without comorbid conditions, antihypertensive drug therapy should be used to keep systolic BP (sBP) at 130 to 155 mm Hg and diastolic BP (dBP) at 80 to 105 mm Hg (**III-C**).
2. For women with comorbid conditions, antihypertensive drug therapy should be used to keep sBP at 130 to 139 mm Hg and dBP at 80 to 89 mm Hg (**III-C**).
3. Initial therapy can be with one of a variety of antihypertensive agents available in Canada: methyldopa (**I-A**), labetalol (**I-A**), other beta-blockers (acebutolol, metoprolol, pindolol, and propranolol) (**I-B**) and calcium channel blockers (nifedipine) (**I-A**).
4. Angiotensin converting enzyme (ACE) inhibitors and angiotensin receptor blockers (ARBs) should not be used (**II-2E**)
5. Atenolol and prazosin are not recommended. (**I-D**)

Corticosteroids for Acceleration of Fetal Pulmonary Maturity

1. Antenatal corticosteroid therapy should be considered for all women who present with preeclampsia before 34 weeks' gestation (**I-A**).
2. Antenatal corticosteroid therapy may be considered for women who present at < 34 weeks' with gestational hypertension (despite the absence of proteinuria or adverse conditions) if delivery is contemplated within the next 7 days (**III-I**).

Mode of Delivery

1. For women with any HDP, vaginal delivery should be considered unless a Caesarean section is required for the usual obstetric indications (**II-2B**).
2. If vaginal delivery is planned and the cervix is unfavourable, then cervical ripening should be used to increase the chance of a successful vaginal delivery (**I-A**).
3. Antihypertensive treatment should be continued throughout labour and delivery to maintain sBP at <160 mm Hg and dBP at <110 mm Hg (**II-2B**).
4. The third stage of labour should be actively managed with oxytocin 5 units intravenously (IV) or 10 units intramuscularly (IM), particularly in the presence of thrombocytopenia or coagulopathy (**I-A**).
5. Ergometrine should not be given in any form (**II-3D**).

Anaesthesia, Including Fluid Administration

1. The anaesthesiologist should be informed when a woman with preeclampsia is admitted to delivery suite (**II-3B**).
2. A platelet count should be performed in all women with HDP on admission to the delivery suite, but tests of platelet function are not recommended (**III-C**).
3. Regional analgesia and/or anaesthesia are appropriate in women with a platelet count >75 x 10^9/L, unless there is a coagulopathy, falling platelet concentration, or co-administration of an antiplatelet agent (e.g., aspirin [ASA]) or anticoagulant (e.g., heparin) (**III-B**).
4. Regional anaesthesia is an appropriate choice for women who are taking low-dose ASA in the absence of coagulopathy and in the presence of an adequate platelet count (**I-A**)

5. Regional anaesthesia is an appropriate choice for women on low-molecular weight heparin (LMWH) 12 hours after a prophylactic dose, or 24 hours after a therapeutic dose (**III-B**).
6. Early insertion of an epidural catheter (in the absence of contraindications) is recommended for control of pain (**I-A**).
7. A fixed intravenous fluid bolus should not be administered prior to regional analgesia and/or anaesthesia (**I-D**).
8. Small doses of phenylephrine or ephedrine may be used to prevent or treat hypotension during regional anaesthesia (**I-A**).
9. In the absence of contraindications, all of the following are acceptable methods of anaesthesia for women undergoing Caesarean section: epidural, spinal, combined spinal-epidural, and general anaesthesia (**I-A**).
10. Intravenous and oral fluid intake should be minimized in women with preeclampsia, to avoid pulmonary edema (**II-1B**).
11. Fluid administration should not be routinely administered to treat oliguria (< 15 mL/hr) (**III-D**).
12. For persistent oliguria, neither dopamine nor furosemide is recommended (**I-D**).
13. Central venous access is not routinely recommended, and if a central venous catheter is inserted, it should be used to monitor trends and not absolute values (**II-2D**).
14. Pulmonary artery catheterization is not recommended unless there is a specific associated indication (**III-D**), and then only in a high dependency unit setting (**III-B**).

Aspects of Care Specific to Women with Pre-Existing Hypertension

1. Pre-conceptual counselling for women with pre-existing hypertension is recommended (**III-I**).
2. Discontinue angiotensin-converting enzyme (ACE) inhibitors and angiotensin receptor blockers (ARBs) pre-pregnancy (or as soon as pregnancy is diagnosed) (**II-2D**).
3. If antihypertensive agent(s) are to be discontinued or changed to allow treatment to continue during pregnancy, then consider changing the agent(s) pre-pregnancy if the woman has uncomplicated pre-existing hypertension, or, if in the presence of comorbid conditions, she is likely to conceive easily (within 12 months) (**III-I**).
4. Consider discontinuing atenolol when pregnancy is diagnosed (**I-D**).
5. A variety of antihypertensive drugs may be used in the first trimester of pregnancy (e.g., methyldopa, labetalol, and nifedipine) **(II-2B**).

Timing of Delivery of Women with Preeclampsia

1. Obstetric consultation is mandatory in women with severe preeclampsia (**III-B**).
2. For women at < 34 weeks' gestation, expectant management of preeclampsia (severe or non-severe) may be considered, but only in perinatal centres capable of caring for very preterm infants (**I-C**).
3. For women at 34 to 36 weeks' gestation with non-severe preeclampsia, there is insufficient evidence to make a recommendation about the benefits or risks of expectant management (**III-I**).

4. For women at $\geq$ 37 weeks' gestation with preeclampsia (severe or non-severe), immediate delivery should be considered (**III-B**).

Magnesium Sulphate ($MgSO_4$) for Eclampsia Prophylaxis or Treatment

1. $MgSO_4$ is recommended for first-line treatment of eclampsia (**I-A**).
2. $MgSO_4$ is recommended as prophylaxis against eclampsia in women with severe preeclampsia (**I-A**).
3. $MgSO_4$ may be considered for women with non-severe preeclampsia (**I-C**).
4. Phenytoin and benzodiazepines should not be used for eclampsia prophylaxis or treatment, unless there is a contraindication to $MgSO_4$ or it is ineffective (**I-E**).

Plasma Volume Expansion for Preeclampsia

1. Plasma volume expansion is not recommended for women with preeclampsia (**I-E**).

Therapies for Hemolysis, Elevated Liver Enzymes, and Low Platelet Count (HELLP) Syndrome

1. Prophylactic transfusion of platelets is not recommended, even prior to Caesarean section, when platelet count is > $50x10^9$/L and there is no excessive bleeding or platelet dysfunction (**II-2D**).
2. Consideration should be given to ordering blood products, including platelets, when platelet count is <$50x10^9$/L, platelet count is falling rapidly, and/or there is coagulopathy (**III-I**).
3. Platelet transfusion should be strongly considered prior to vaginal delivery when platelet count is < $20x10^9$/L (**III-B**).
4. Platelet transfusion is recommended prior to Caesarean section, when platelet count is < 20 $x10^9$/L (**III-B**).
5. Corticosteroids may be considered for women with a platelet count < $50x10^9$/L (**III-I**).
6. There is insufficient evidence to make a recommendation regarding the usefulness of plasma exchange or plasmapheresis (**III-I**).

Other Therapies for Treatment of Preeclampsia

1. Women with preeclampsia before 34 weeks' gestation should receive antenatal corticosteroids for acceleration of fetal pulmonary maturity (**I-A**).
2. Thromboprophylaxis may be considered when bed rest is prescribed (**II-2C**).
3. Low-dose aspirin is not recommended for treatment of preeclampsia (**I-E**).
4. There is insufficient evidence to make recommendations about the usefulness of treatment with the following: activated protein C (**III-I**), antithrombin (**I-I**), heparin (**III-I**), L-arginine (**I-I**), long-term epidural anaesthesia (**I-I**), N-acetylcysteine (**I-I**), probenecid (**I-I**), or sildenafil nitrate (**III-I**).

Postpartum Treatment

1. BP should be measured during the time of peak postpartum BP, at days three to six after delivery (**III-B**).

2. Antihypertensive therapy may be restarted post partum, particularly in women with severe preeclampsia and those who have delivered preterm (**II-2 I**).
3. Severe postpartum hypertension should be treated with antihypertensive therapy, to keep sBP < 160 mm Hg and diastolic BP < 110 mm Hg (**II-2B**).
4. Antihypertensive therapy may be used to treat non-severe postpartum hypertension, particularly in women with comorbidities (**III-I**).
5. Antihypertensive agents acceptable for use in breastfeeding include the following: nifedipine XL, labetalol, methyldopa, captopril, and enalapril (**III-B**).
6. There should be confirmation that end-organ dysfunction of preeclampsia has resolved (**III-I**).
7. Non-steroidal anti-inflammatory drugs (NSAIDs) should not be given post partum if hypertension is difficult to control or if there is oliguria, an elevated creatinine (i.e., $\geq$100 microM), or platelets < 50 x10^9/L (**III-I**).
8. Postpartum thromboprophylaxis may be considered in women with preeclampsia, particularly following antenatal bed rest for more than four days or after Caesarean section (**III-I**).
9. LMWH should not be administered post partum until at least two hours after epidural catheter removal (**III-B**).

Care Beyond Six Weeks Post Partum

1. Women with a history of severe preeclampsia (particularly those who presented or delivered before 34 weeks' gestation) should be screened for pre-existing hypertension (**II-2B**), underlying renal disease (**II-2B**), and thrombophilia (**II-2C**).
2. Women should be informed that intervals between pregnancies of < 2 or $\geq$ 10 years are both associated with recurrent preeclampsia (**II-2D**).
3. Women who are overweight should be encouraged to attain a healthy body mass index to decrease risk in future pregnancy (**II-2A**) and for long-term health (**I-A**).
4. Women with pre-existing hypertension should undergo the following investigations (if not done previously): urinalysis; serum sodium, potassium and creatinine; fasting glucose; fasting total cholesterol and high-density lipoprotein cholesterol, low-density lipoprotein cholesterol and triglycerides; and standard 12-lead electrocardiography (**III-I**).
5. Women who are normotensive but who have had an HDP, may benefit from assessment of traditional cardiovascular risk markers (**II-2B**)
6. All women who have had an HDP should pursue a healthy diet and lifestyle (**I-B**).

Definitions:

Quality of Evidence Assessment*

I: Evidence obtained from at least one properly randomized controlled trial

II-1: Evidence from well-designed controlled trials without randomization

II-2: Evidence from well-designed cohort (prospective or retrospective) or case-control studies, preferably from more than one centre or research group

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Classification of Recommendations**

A. There is good evidence to recommend the clinical preventive action

B. There is fair evidence to recommend the clinical preventive action

C. The existing evidence is conflicting and does not allow to make a recommendation for or against use of the clinical preventive action; however, other factors may influence decision-making

D. There is fair evidence to recommend against the clinical preventive action

E. There is good evidence to recommend against the clinical preventive action

I. There is insufficient evidence (in quantity or quality) to make a recommendation; however, other factors may influence decision-making

*The quality of evidence reported in these guidelines has been adapted from the Evaluation of Evidence criteria described in the Canadian Task Force on the Preventive Health Care.

**Recommendations included in these guidelines have been adapted from the Classification of Recommendations criteria described in the Canadian Task Force on the Preventive Health Care.

CLINICAL ALGORITHM(S)

None provided

EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of supporting evidence is identified and graded for each recommendation (see "Major Recommendations").

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

Appropriate treatment of the hypertensive disorders of pregnancy (HDP)

POTENTIAL HARMS

Adverse Effects of Treatment

- Bed rest may have harmful physical, psychosocial, and financial effects.
- Antihypertensive therapy may be harmful. A study found a significant relationship between the antihypertensive-induced fall in mean arterial pressure and the risk of small for gestational age infants or lower birthweight. Antihypertensives have the potential for tetrogenicity.
- Hydralazine may be associated with maternal hypotension, Caesarean section (CS), and adverse fetal heart rate (FHR) effects.
- Caution should be exercised in ensuring that the correct form of nifedipine has been prescribed.
- Magnesium sulphate ($MgSO_4$) is associated with a higher CS rate, maternal adverse effects, and is very expensive.
- The risk of neuromuscular blockade with contemporaneous use of nifedipine and MgSO4 is <1%.
- Atenolol has the potential for adverse effects on fetal growth; particularly when used in early pregnancy.
- Antenatal corticosteroids may cause significant, transient changes in FHR and variability up to four days after administration.
- General anesthesia in women with a hypertensive disorder is more likely to be associated with difficult (or failed) intubation and with a hypertensive response to intubation.
- Epidural analgesia lowers BP and possibly cerebral blood flow index.

CONTRAINDICATIONS

CONTRAINDICATIONS

Parenteral labetalol should best be avoided in women with asthma or heart failure. It may cause neonatal bradycardia.

QUALIFYING STATEMENTS

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This guideline reflects emerging clinical and scientific advances as of the date issued and are subject to change. The information should not be construed as dictating an exclusive course of treatment or procedure to be followed. Local institutions can dictate amendments to these opinions. They should be well documented if modified at the local level.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better

IOM DOMAIN

Effectiveness
Safety

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

Magee LA, Helewa M, Moutquin JM, von Dadelszen P, Hypertension Guideline Committee, Society of Obstetricians and Gynaecologists of Canada. Treatment of the hypertensive disorders of pregnancy. In: Diagnosis, evaluation, and management of the hypertensive disorders of pregnancy. J Obstet Gynaecol Can 2008 Mar;30(3 Suppl 1):S24-36.

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

2008 Mar

GUIDELINE DEVELOPER(S)

Society of Obstetricians and Gynaecologists of Canada - Medical Specialty Society

SOURCE(S) OF FUNDING

Society of Obstetricians and Gynaecologists of Canada

GUIDELINE COMMITTEE

Hypertension Guideline Committee

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FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

GUIDELINE STATUS

This is the current release of the guideline.

GUIDELINE AVAILABILITY

Electronic copies: Available in Portable Document Format (PDF) from the Society of Obstetricians and Gynaecologists of Canada Web site.

Print copies: Available from the Society of Obstetricians and Gynaecologists of Canada, La société des obstétriciens et gynécologues du Canada (SOGC) 780 promenade Echo Drive Ottawa, ON K1S 5R7 (Canada); Phone: 1-800-561-2416

AVAILABILITY OF COMPANION DOCUMENTS

None available

PATIENT RESOURCES

None available

NGC STATUS

This NGC summary was completed by ECRI Institute on February 17, 2009. The information was verified by the guideline developer on March 13, 2009.

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